DRAFT, Version 1.1

Draft Management Recommendations for
Ulota megalospora Vent. *in* Roell

Version 1.1
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EXECUTIVE SUMMARY

Species: *Ulota megalospora* Vent. *in* Roell

Taxonomic Group: Bryophyte: Moss

ROD Components: Protection Buffer Species (p. C-20)

Other Management Status: none

Range: Endemic to the Pacific Northwest, occurring from northern California to British Columbia and inland to Idaho. It has been reported from 35 sites in Clallam, Grays Harbor, King, Lewis, Pierce, Skagit, Snohomish, and Whatcom counties in Washington; Clackamas, Clatsop, Curry, Linn, Multnomah, and Tillamook counties in Oregon, and Del Norte, Humboldt, and Trinity counties in California. There are three known sites on federal land: in the Olympic and Mt. Rainier National Parks and on Gifford Pinchot National Forest.

Specific Habitat: This species is common and widespread on twigs and branches in the canopy of old-growth forests at low to middle elevations throughout most of the region. At lower elevations, it occurs most frequently on trunks of red alder, but may also occur on oceanspray, vine maple, and big-leaf maple. It is also found on conifer trunks at higher elevations in the Saddle Mountain and Grassy Knoll areas.

Threats: Deterioration of air quality may affect epiphytic bryophytes. The alteration of habitat by harvest associated with special forest products or removal of host tree substrates may impact populations. The level of risk to this species is low.

Management Recommendations:
Information gathered subsequent to the Scientific Analysis Team Report (1993), where this species was identified as a "Mitigation Step 5" species, suggests that Protection Buffers are not required at all known sites, if continuity of habitat over time is provided within the watershed. Sufficient protection may be provided in some areas by riparian reserves, late-successional reserves, and administratively withdrawn areas. In areas where *Ulota megalospora* is poorly represented, especially for disjunct or localized populations, maintain habitat at known sites.

Information Needs:
Known populations should be visited and verified and efforts made to find additional populations on federal land. An evaluation of the need to provide specific management for this regional endemic should be prepared, once current information is available.

I. Natural History

A. Taxonomic/Nomenclatural History

Ulota megalospora Vent. *in* Roell was described in 1890. There are no recent synonyms. *Ulota megalospora* is classified in the order Orthotrichales, family Orthotrichaceae.

B. Species Description

1. Morphology (Grout 1933, Lawton 1971, Vitt et al. 1988:66)

Plants of *Ulota megalospora* are dark green to yellow-green, growing in small dense tufts. The prostrate main stems have numerous, erect, short (to 1.5 cm) branches. Leaves are contorted to crisped when dry, narrowly lanceolate with filiform-acuminate apices often ending in a linear row of 1-9 cells. Gemmae are lacking. Spores are very large [30-45 (60) Fm].

The filiform leaf apex with about 3-7 isodiametric to short-rectangular uniseriate cells is diagnostic in *Ulota megalospora*. Four other species of *Ulota* may occur in this area. *U. phyllantha* grows in areas receiving salt-spray and has reddish brown, septate gemmae at the leaf tips. The *Ulota crispa* var. *alaskana* as cited in Lawton is actually synonymous with *U. obtusiuscula*. *Ulota obtusiuscula* has leaves that are not apiculate and the spores are 15-30 Fm. *Ulota obtusiuscula* is a robust species that forms large cushions, while *Ulota megalospora* has slender, creeping stems, and forms tiny tufts.

According to Norris (pers. comm.), the exerted capsules of *Ulota* are reminiscent of those of *Orthotrichum* in having sulcate capsules with plicate and often hairy calyptrae. *Ulota*, however, has leaves with an abruptly differentiated, broadened and often concave base, and leaves are crisped when dry, unusual in the closely related genus, *Orthotrichum*.

Matthew Nash, a graduate student of Dale Vitt,, is currently monographing the genus *Ulota* for North America and considers *Ulota megalospora* a well differentiated species.

Figure 1. Line drawing of *Ulota megalospora* from Grout (1933) and Lawton (1971) (to be added). (AWAITING COPYRIGHT PERMISSION)

2. Reproductive Biology

Sporophytes of *Ulota megalospora* mature in spring to early summer (Schofield, pers. comm.).

3. Ecology

The species is a pioneer bryophyte on twigs and branches in the outer canopy of coniferous and deciduous trees, where lichens rather than bryophytes are the dominant epiphytes (Pike et al. 1975). Exposure in the outer canopy subjects it to frequent wetting and drying cycles. It can tolerate drier conditions overall than bryophytes found lower in the canopy and in the understory

and may have a higher light requirement (Harpel, pers. comm.).

C. Range, Known Sites

This species is endemic to the Pacific Northwest, occurring from northern California to British Columbia and inland to Idaho. It has been reported from Clallam, Grays Harbor, King, Lewis, Pierce, Skagit, Snohomish, and Whatcom counties in Washington; Clackamas, Clatsop, Curry, Linn, Multnomah, Tillamook counties in Oregon, and Del Norte, Humboldt, Trinity counties in California. Three sites are documented from federal land in the Gifford Pinchot National Forest, and the Mt. Rainier and Olympic National Parks.

At least 35 known sites have been documented within the range of the northern spotted owl.

Figure 2. Known sites of *Ulota megalospora* (to be added).

D. Habitat Characteristics and Species Abundance

This species is common and widespread on twigs and branches in the canopy of old-growth forests at low to middle elevations throughout most of the region. *Ulota megalospora* was also observed on the undersides of small limbs on the edge of a Douglas-fir tree exposed to full sun up 150 to 200' in the canopy (Harpel, pers. comm.). It occurs most frequently on *Alnus rubra* (red alder), but may also occur on *Pseudotsuga menziesii* (Douglas-fir), *Holodiscus discolor* (oceanspray), *Sambucus* (elderberry), *Acer circinatum* (vine maple), and *Acer macrophyllum* (big-leaf maple). According to Schofield (pers. comm.), it occurs on relatively young alders and may not be confined to old-growth forests. It is also found on conifer trunks on the Gifford Pinchot National Forest and at higher elevations on Saddle Mountain in the Oregon Coast Range.

It is more common in the north where it is restricted to coastal situations, especially as an epiphyte on deciduous trees. It is also common on the Queen Charlotte Islands on scrubby pine trunks in open peatlands.

II. Current Species Situation

A. Why Species is Listed under Survey and Manage Standards and Guidelines

Ulota megalospora was included in the list of species covered by Mitigation Step 5 of the Scientific Analysis Team Report (Thomas, et al. 1993). Mitigation activities prescribed in this document include surveying to determine presence and distribution, and to defer timber harvest and other activities which would not maintain desired habitat characteristics and population levels.

As part of the mitigation, it was recommended that Regional ecologists or botanists 1) maintain a spatially explicit database of all known sites and 2) develop species or area management plans.

The bryophyte viability panels convened by the Forest Ecosystem Assessment Team included *Ulota megalospora* in the group of exterior canopy twig species. Their viability ratings under the original Option 9 indicated a high level of confidence that this group would remain well distributed throughout their range. However, in the Record of Decision, the species referenced in the Mitigation Measure Step 5 from the Scientific Analysis Team Report were included as "Protection Buffer Species".

The level of risk for this species is low, based on the relatively large number of known sites and the apparent tolerance of this species to some degree of desiccation.

B. Major Habitat and Viability Considerations

C. Threats to the Species

This epiphytic species is vulnerable to air pollution originating primarily from non-federal lands. Its small size and location at the periphery of the canopy, where aerosols have the greatest impact, puts it at risk. Declines in air quality were implicated in the decline of related *Ulota crispa* in Sweden (Hallingbäck 1992). Damage or removal of habitat could also result from removal of alder, road or trail construction, and special forest product harvest.

D. Distribution Relative to Land Allocations

Three of the known sites for *Ulota megalospora* occur within Olympic and Mt. Rainier National Parks. One occurs in T.T. Munger Research Natural Area (Gifford Pinchot National Forest).

III. Management Goals and Objectives

A. Management Goals for the Taxon

The goal for the management of *Ulota megalospora* is to assist in maintaining species viability

B. Specific Objectives

Maintain habitat for disjunct and localized populations by retaining existing stand structure and microclimate.

IV. Habitat Management

A. Lessons from History

There is a considerable literature on the decline of bryophytes in Europe. Rapid decreases and fragmentation of primeval forests have caused a serious threat to bryophytes (Laaka 1992). In addition, air pollution (particularly sulphur compounds in combination with low pH) and acid rain are implicated in declines of bryophytes (Hallingbäck 1992, Rao 1982). The extinction rate and rates of decline are high in areas where trends are documented (Greven 1992, Hallingbäck 1992). Regarding this species, factors associated with logging that cause declines in bryophytes include an increased dispersal distance between fragments of primeval forest (Laaka 1992).

B. Identification of Habitat Areas for Management

Fifteen of the 35 known sites are documented from southwestern Oregon and northern California. Based on current information, no specific habitat areas are identified for management. Particularly, management for this species is not necessary at all sites where several populations occur nearby. If disjunct or highly localized populations are identified, they should be maintained.

C. Management within Habitat Areas

If known occupied sites are disjunct or highly localized, manage populations according to the following direction from the Record of Decision (USDA and USDI 1994): Defer timber harvest or other activities that would not maintain desired habitat characteristics and population levels (p. C-20). In addition, the ROD states that mitigation activities include conducting basic ecological studies and surveying for presence, particularly in Oregon.

D. Other Management Issues and Considerations

Based on information now available, it appears that *Ulota megalospora* may be an appropriate candidate to recommend moving to the Strategy 3 list. Although it often occurs in diffusely lit older stands, its presence at other sites suggests it may not require conditions provided exclusively by late-successional and old-growth forests. This species is a candidate for evaluation of appropriate listing category.

V. Research, Inventory and Monitoring Needs

A. Data Gaps and Information Needs

Conduct region wide surveys to determine distribution, species abundance, and ecological requirements of this Pacific Northwest endemic.

B. Research Questions

- What is the degree of association of *Ulota megalospora* with late-successional and old-growth forests in the Pacific Northwest. Does this species occur in younger stands?
- What is the response of *Ulota megalospora* to changes in microclimate?
- How is *Ulota megalospora* distributed in the forest canopy? The population at the Wind River canopy crane site on the Gifford Pinchot National Forest offers a unique opportunity to monitor growth rates, population trends and to study the ecology and distribution of this species in the forest canopy.
- What is the sensitivity of *Ulota megalospora* to air pollution?
- What is the effect of aerial applications of fertilizer on *Ulota megalospora*?

C. Monitoring Needs and Recommendations

None recommended at this time.

VI. References

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